maximum thickness to the minimum thickness of said inorganic oxide layer is 1.5 or less.

Please amend claim 2 as follows:

2. [Amended] A functional roll film according to claim 1, wherein said inorganic oxide layer comprises a composite oxide having at least two components, wherein the difference between a maximum wt% of and minimum wt% of one component of the composite oxide is within 20 wt%.

REMARKS

Entry of the foregoing amendments and reconsideration of the subject application is respectfully requested. Claims 1 and 2 have been amended. Claims 1-4 are under examination. Claims 5-19 have been withdrawn from consideration as being directed to a non-elected invention.

The present invention is directed to a transparent plastic film comprising an inorganic oxide layer on a surface thereof. The inorganic oxide layer provides gas barrier properties to the transparent plastic film. It is important that the inorganic oxide layer remain flexible, transparent and provide good gas barrier properties. Where the inorganic oxide layer is too thick, its flexibility is lowered and the gas barrier layer may crack, negatively affecting its ability to reduce gas permeability. Where the inorganic oxide layer is too thin, it may provide inadequate gas barrier properties. In accordance with these objectives, the present invention provides a transparent plastic film having a uniformly thick inorganic oxide layer that provides good gas barrier properties while retaining transparency thereof and avoiding inorganic oxide layer thicknesses that not necessary to provide such gas barrier properties and that render the inorganic oxide layer susceptible to cracking. The functional film of the present invention is manufactured more economically by utilizing a minimum thickness of the inorganic oxide layer that provides adequate gas barrier properties while retaining its transparency and flexibility.

In one aspect, the present invention provides an inorganic oxide layer of uniform thickness. Thus, the ratio (in a production unit of the film, e.g., a roll of the film) of the maximum inorganic oxide layer thickness to the minimum inorganic oxide layer thickness is 1.5 or less. When the maximum thickness of the inorganic oxide layer exceeds 1.5 times the

minimum thickness of the inorganic oxide layer, there is an increased susceptibility to cracking at the thicker regions. Such cracking can deleteriously affect the gas barrier properties of the inorganic oxide layer.

In accordance with another aspect, the present invention provides an inorganic oxide layer comprising a composite oxide of uniform composition. Thus, the composite oxide has at least two components and the difference (in a production unit of the film, e.g., a roll of the film) between the maximum wt% of a component to the minimum wt% of that component is within 20 wt%.

Rejection of claims 1-4 under 35 U.S.C. § 112, 1st paragraph

Claims 1-4 have been rejected under 35 U.S.C. § 112, 1st paragraph as allegedly failing to provide an description of the terms "minimum thickness" and "maximum thickness" to reasonably convey to one skilled in the art that Applicants had possession of this claimed subject matter. This rejection is respectfully traversed insofar as the Examiner considers it applicable to the claims as amended.

It is respectfully submitted that this rejection is more aptly directed to the definiteness requirement of 35 U.S.C. § 112, *2nd* paragraph. Applicants have clearly disclosed, in the paragraph bridging pp. 4-5 of the specification, the meaning of the terms "minimum" and "maximum" as used in the claims to describe the thickness of the inorganic oxide layer. In this regard, the specification states (emphasis added):

> The ***maximum value and the minimum value*** of the film thickness of the inorganic oxide layer mentioned in the present invention ***respectively mean a thickness of the thickest portion and a thickness of the thinnest portion of the thickness*** measured in one production unit, e.g., one roll unit of a plastic film which is winded.

In view of the foregoing disclosure, it is respectfully submitted that a person having ordinary skill in the art would understand that the terms "minimum thickness" and "maximum thickness" refer, respectively, to the minimum and maximum thicknesses of the inorganic oxide layer in a production unit, e.g., a roll, of the claimed transparent film. In accordance with the present invention, the thickness of the inorganic oxide layer is uniform, i.e., the ratio of the maximum thickness to the minimum thickness of the inorganic oxide layer is 1.5 or less.

It is respectfully submitted that Applicants have, therefore, described the terms "minimum thickness" and "maximum thickness" in a manner that fully complies with the requirements of 35 U.S.C. § 112, 1st and 2nd paragraphs. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Rejection of claims 1-4 under 35 U.S.C. § 112, 2nd paragraph

Claims 1-4 have been rejected under 35 U.S.C. § 112, 2nd paragraph as allegedly being indefinite with respect to the terms "wound like roll" and "maximum thickness". This rejection is respectfully traversed insofar as the Examiner considers it applicable to the claims as amended.

Claim 1 has been amended to delete the language "wound like roll" which obviates this aspect of the rejection. Claim 1 has been amended to recite that the transparent "plastic film is formed into a roll". It is respectfully submitted that a person skilled in the art would understand the meaning of a plastic film formed into a roll as presently claimed.

It is respectfully submitted that the term "maximum thickness" would be clearly understood by one skilled in the art, in light of the specification of the subject application, as referring to the maximum thickness of the inorganic oxide layer of the transparent plastic film. As discussed above, the meaning of this term is disclosed in the paragraph bridging pp. 4-5 of the specification and the person having ordinary skill in the art would be reasonably apprised of its scope.

It is, therefore, respectfully submitted that Applicants have described the term "maximum thickness" in a manner that fully complies with the requirements of 35 U.S.C. § 112, 2nd paragraph. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Rejection of claims 1 and 2 under 35 U.S.C. § 102(b)

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Matsuda et al. (U.S. Patent No. 5,725,958, "Matsuda"). This rejection is respectfully traversed insofar as the Examiner considers it applicable to the claims as amended.

In respect to claim 1, the Examiner asserts that Matsuda discloses at col. 6, lines 56-60, that the maximum thickness of the inorganic oxide layer is 1.5 times or less of a minimum

thickness. It is respectfully submitted that the passage in Matsuda cited by the Examiner does not in any way teach or suggest that the ratio of the maximum thickness of the inorganic oxide layer to the minimum thickness of the inorganic oxide layer in the claimed transparent plastic film is 1.5 or less.

The passage cited by the Examiner merely discloses preferred ranges of thicknesses for an inorganic oxide layer that may be used to provide gas barrier properties. This passage does not disclose anything about the uniformity of the thickness of the inorganic oxide layer, expressed in claim 1 by the recitation that the ratio of the maximum to minimum thicknesses of the inorganic oxide layer on the claimed transparent plastic film is 1.5 or less. This claimed feature relates to the uniformity in thickness of the inorganic oxide layer on a transparent plastic film.

Applicants have found a means to control the thickness of the inorganic oxide layer during formation thereof, to ensure that such layer retains adequate flexibility, gas barrier properties and transparency. In particular, Applicants have found that adequate flexibility, gas barrier properties and transparency of the inorganic oxide layer are provided when the thickness uniformity of the inorganic oxide layer is such that the ratio of its maximum thickness to its minimum thickness in a production unit, such as a roll of the film, is 1.5 or less.

Matsuda provides no disclosure with respect to ensuring inorganic oxide layer thickness uniformity or how the thickness of such layer affects the physical properties of the resultant film. Matsuda merely discloses preferred thicknesses of such layer, without any disclosure as to how to achieve thickness uniformity of the inorganic oxide layer in a transparent plastic film provided with such layer for gas barrier properties. Matsuda is, instead, directed to a method for increasing the specific gravity of an inorganic oxide layer applied by vapor deposition to ensure that adequate gas barrier properties are achieved. For example, at col. 5, lines 13-37, Matsuda discloses that conventional vapor deposition processes result in inorganic oxide layers having a lower specific gravity than the oxides prior to application as a thin layer. Matsuda discloses that this lower specific gravity does not provide adequate gas barrier properties. Accordingly, Matsuda discloses a process by which the specific gravity of the inorganic oxide layer is from 55%-100% of the specific gravity of the oxides prior to application. According to Matsuda, this provides an inorganic oxide layer having adequate gas barrier properties. Matsuda's disclosure in no way relates to or suggests

thickness uniformity of the inorganic oxide layer. In particular, Matsuda does not disclose or enable one skilled in the art to provide an inorganic oxide layer such that the ratio of its maximum to minimum thicknesses in a production unit, such as a roll of film, is 1.5 or less.

There is no disclosure in Matsuda that the claimed ratio of maximum to minimum thicknesses of the inorganic oxide layer can be achieved by using the emission current, film feeding speed and vapor pressures disclosed in Matsuda. Matsuda does not disclose that such parameters may be controlled to provide thickness uniformity, as claimed, of the inorganic oxide layer. Indeed, controlling such process parameters will not result in adequate thickness uniformity as disclosed and claimed in the subject application. During prolonged application of an inorganic oxide layer by vapor deposition, the amount of inorganic oxide material evaporated varies greatly, resulting in unacceptable variations in the thickness of the inorganic oxide layer on the transparent plastic film. For example, the temperature of the vapor deposition material changes with time and, consequently, the amount of material evaporated changes and produces thickness variations.

The subject application discloses continuous monitoring of the thickness of the inorganic oxide layer during formation thereof on the transparent plastic film and utilizing the information obtained thereby to control the vapor deposition parameters, e.g., the electron beam gun used to effect evaporation, to ensure that the ratio of the maximum to minimum thicknesses of the inorganic oxide layer in a production unit, such as a roll of the film, does not exceed 1.5. Nowhere in Matsuda is any disclosure of this novel and unobvious product. Accordingly, Matsuda does not anticipate or render obvious claim 1 of the subject application.

Claim 2 has also been rejected as allegedly being anticipated by Matsuda. Claim 2 is patentable over Matsuda at least by virtue of its dependency from claim 1. Nonetheless, Applicants make the following further distinctions between claim 2 and Matsuda.

The Examiner also asserts that col. 4 , lines 21-26 and 39-44 of Matsuda discloses that "a difference between a maximum value and a minimum value of a composition of one component of composite oxide matter is within 20 wt%". The passages cited by the Examiner merely disclosed preferred weight percentages of components in a composite oxide in a thin layer used for gas barrier properties. This passage does not disclose anything about the uniformity of the composition of the inorganic oxide layer when it contains a mixture of two or more inorganic oxide materials. As recited in claim 2, the uniformity of the

composition of the composite oxide is such that the difference between the maximum and minimum weight percentages of a component in the oxide is within 20 wt%.

As with thickness uniformity, uniformity of the composition of the inorganic oxide layer is important to ensuring adequate gas barrier properties. Page 6 of the specification (next to last paragraph) discloses that the maximum and minimum weight percentages refer to the maximum and minimum weight percentages of a component in the inorganic oxide layer in a production unit, such as a roll of the film. Matsuda does not disclose or suggest, as claimed, uniformity in the composition of a composite oxide when used as a gas barrier layer, such that the difference between the maximum and minimum weight percentages of a component in the composite oxide, provided as a thin layer on the transparent plastic film, is within 20 wt%. Accordingly, Matsuda does not anticipate or render obvious claim 2.

For the foregoing reasons, it is respectfully submitted that Matsuda does not anticipate claims 1 and 2 of the subject application under 35 U.S.C. § 102(b). Nor does Matsuda render obvious these claims. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Rejection of claims 3 and 4 under 35 U.S.C. § 102(b) and/or 35 U.S.C. § 103(a)

Claims 3 and 4 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by or, in the alternative, as being rendered obvious under 35 U.S.C. § 103(a) by Matsuda et al. (U.S. Patent No. 5,725,958, "Matsuda"). This rejection is respectfully traversed insofar as the Examiner considers it applicable to the claims as amended.

Claims 3 and 4 are dependent either directly or indirectly from claim 1. Thus, it is respectfully submitted that claims 3 and 4 are patentable over Matsuda at least for the reasons discussed above in respect to claim 1.

The Examiner contends that the limitations of claims 3 and 4, if not inherently disclosed in Matsuda are obvious in view of Matsuda. The Examiner supports this position merely by noting that Matsuda uses "similar materials". It is respectfully submitted that the Examiner has failed to make out a *prima facie* case of inherency. The Patent Office Board of Appeals has held that the Examiner must provide some basis in fact and/or technical reasoning to support a rejection based on inherency. *See*, *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)("In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the

determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." It is respectfully submitted that the Examiner's mere assertion that because "similar materials" are used in Matsuda, is inadequate to establish that the static electricity range of from -10 kV to +10 kv as recited in claim 3 and the variation in thickness of the inorganic oxide film of ±20% as recited in claim 4 ***necessarily*** flow from the disclosure of Matsuda. The Examiner has simply failed to show that the process disclosed in Matsuda would necessarily result in the features recited in claims 3 and 4.

Moreover, the Examiner's citation of col. 6, lines 56-60 of Matsuda in respect to thickness variation is misplaced. This passage, as discussed above, merely discloses preferred thickness ranges, and neither teaches nor suggests anything with respect to thickness uniformity of an inorganic oxide layer on a transparent plastic sheet.

Indeed, as discussed above, Matsuda neither recognizes the importance of nor provides any disclosure with respect to achieving uniformity of the thickness of the inorganic oxide layer. Matsuda fails to appreciate that control of thickness uniformity as disclosed in the present invention ensures transparency, flexibility and good gas barrier properties of the inorganic oxide layer. Similarly, Matsuda et al. fails to appreciate the significance of ensuring that the static electricity does not exceed the parameters recited in claim 3. Thus, contrary to the Examiner's assertion, Matsuda does not even disclose the "general conditions" of claims 3 and 4.

Therefore, it is respectfully submitted that Matsuda does not inherently anticipate or render obvious claims 3 and 4. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

It is respectfully submitted that the present application is in condition for allowance, which action is earnestly solicited. Upon consideration of this response, the Examiner is kindly invited to contact the undersigned to discuss any matter that would expedite allowance of the subject application.

Respectfully submitted,

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Dated: March 27, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. [Amended] A functional roll film comprising[;]:

a transparent plastic film [which is transparent and] having gas barrier properties, and [provided at its at least one surface with] having an inorganic oxide layer on at least one surface [and which is wound like a roll]; wherein the plastic film is formed into a roll; [wherein a maximum thickness of said inorganic oxide layer is 1.5 times or less of a minimum thickness] and the ratio of the maximum thickness to the minimum thickness of said inorganic oxide layer is 1.5 or less.

2. [Amended] A functional roll film according to claim 1, wherein said inorganic oxide layer comprises a composite oxide [matter in which at least two or more kinds of oxide matters are composite] having at least two components, [and a difference between a maximum value and a minimum value of a composition of one component of said composite oxide matter] wherein the difference between a maximum wt% of and minimum wt% of one component of the composite oxide is within 20 wt%.